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The Gypsy Moth and the Brown-Tail Moth.

FEMALE GYPSY MOTH.
(After Howard, Bur. of Ent., U. S. Dept. of Agr.)

CONTENTS.

	Page.
The Gypsy Moth and the Brown-Tail Moth	3
Connecticut invaded by the Gypsy Moth	3
The Gypsy Moth	4
Life history and injury	4
Means of distribution	6
Natural enemies	7
Importation of parasites	7
Remedial measures	7
The Brown-tail Moth	8
Habits and life history	8
Means of control	10

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The Gypsy Moth and the Brown-Tail Moth.

BY

W. E. BRITTON,

State Entomologist.

Connecticut Invaded by the Gypsy Moth.

The gypsy moth is already in Connecticut, specimens having been found at Stonington, and the entomologist is now hunting and destroying the egg-masses. Everything will be done to exterminate the pest in this locality.

THE DANGER TO CONNECTICUT.

There is good reason to fear that both of these pests will soon bring havoc to the woodlands of the state. The gypsy moth attacks all kinds of trees including pines and other cone-bearing trees, which are ruined by defoliation much sooner than deciduous trees. Fruit and shade trees suffer alike.

The brown-tail moth attacks fruit trees and some of the woodland trees, devouring the leaves; it is also a great nuisance, as the larval hairs break off, and on coming in contact with the human skin, cause extreme irritation and sometimes illness.

WHAT TO DO.

It is earnestly requested that any suspected specimens of eggs, caterpillars or adults be called to the attention of the State Entomologist of this station in order that he may identify them. He will cooperate, so far as he is able, in checking and exterminating these dangerous and destructive enemies of all trees and shrubs. Directions for combating these insects will be found in the following pages.

TRANSPORT NO LIVING INSECTS.

It is against the United States laws to send living insects by mail, and violations of the law are punishable by a heavy fine and imprisonment. It would be dangerous to send such pests as the gypsy or brown-tail moths in any stage of their existence, if alive. All insect specimens should therefore be killed before sending them to be identified.

Eggs, pupæ and larvæ can be killed by dropping them into a jar of alcohol, benzine or gasoline and leaving them for a few hours. When removed the liquid evaporates and they are in good shape for identification. Beetles, bugs and scale insects can be treated in the same way. Moths and butterflies may be killed by the fumes of cyanide, chloroform, ether, carbon bisulphide, or they may be submerged in gasoline or benzine, which kills them quickly without injuring them for the purpose of identification. They should be packed in a tin, wood or strong pasteboard box which will not be crushed in transit.

THE GYPSY MOTH.

Porthetria dispar Linn.

An outbreak of the gypsy moth in Eastern Massachusetts was met by an appropriation by the Legislature of that state for the purpose of suppressing the insect. Exterminative work was commenced in 1890 and kept up for ten years, when it was discontinued. During this period over $1,000,000 was expended and the insect was so far checked that it was doing little damage in 1900. In 1905 the pest had spread over so much territory and had become so troublesome that the commonwealth again took the matter in hand, and is endeavoring to control the insect under the superintendence of Mr. A. H. Kirkland, an appropriation of $300,000 being available to carry on the work until May, 1907.

At the present time the insect is found throughout the eastern portion of Massachusetts, southeastern New Hampshire, and a region in and about Providence, R. I., is known to have been infested for two years or more. It has been reported several times in Connecticut, but always proved to be some other species. In July, 1905, two adult female moths were taken and two males were seen by Mr. E. Frensch at Stonington, and recently egg-masses have been found in the same locality.

Life History and Injury.

The eggs are laid, usually on the trunks and branches of trees, in July and August, in oval masses each containing about 500 eggs and covered with hair as shown in Figure 1.

The eggs hatch about May 1st, and the young caterpillars

soon begin to feed upon the expanding foliage, devouring all kinds of vegetation, even defoliating coniferous trees. All the damage is done in this stage. As the caterpillars approach maturity, they feed mostly at night, and seek shelter during the day on the shady side of the trunks, under fence rails, stones and rubbish, where they may often be found in large numbers.

When full-grown, the caterpillar is between two and three inches long, dark brown, with two rows of red spots and two

FIG. 1.—Egg-mass of gypsy moth.
(After Kirkland.)

rows of blue spots along the back, and is covered with long hairs. (See Figure 2.) The caterpillar usually reaches full size in July, and transforms to a pupa or chrysalis, usually spinning a few threads about itself, as is shown in Figure 3.

During the latter half of July the adult moths emerge, mate, and the females lay eggs. The brown male has a wing expanse of one and one-half inches, and flies about in the daytime in a zigzag course. The female has a heavy body, and does not fly far, though furnished with wings which expand about two inches, and which are nearly white, with delicate black markings. See front page of this bulletin. The male is shown in Figure 4. There is but one brood each season.

Means of Distribution.

As the caterpillars of both species crawl about in going from one tree to another, they are very apt to invade freight

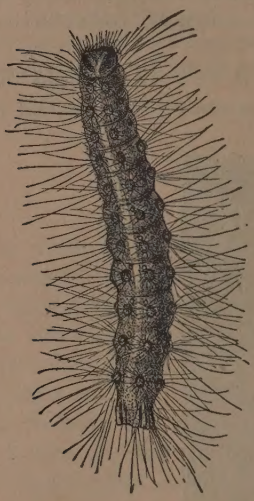

FIG. 2.—Gypsy moth caterpillar.
(After Howard, Bur. of Ent., U. S. Dept. of Agr.)

FIG. 3.—Cocoon of gypsy moth.
(After Howard, Bur. of Ent., U. S. Dept. of Agr.)

cars on the siding, and be carried to other places. Both kinds of caterpillars have the habit of spinning down on slender

FIG. 4.—Male gypsy moth.
(After Howard, Bur. of Ent., U. S. Dept. of Agr.)

threads from their food trees, and may thus drop on carriages, automobiles or railroad cars, and be carried long distances into a part of the country heretofore uninfested.

Natural Enemies.

There are several species of parasitic Hymenoptera, Diptera and predaceous insects that attack both the gypsy and brown-tail moths in Massachusetts, and they are also devoured by birds, toads, and other insectivorous animals. But all of these working together do not control the pests.

Importation of Parasites.

In Europe, the native home of these insects, there are a larger number of parasitic enemies belonging to species not found in this country. During 1905, Dr. L. O. Howard, the Government Entomologist, in coöperation with the Massachusetts authorities, collected in Europe some of the parasites of the gypsy and brown-tail moths, and sent them to Massachusetts, where they will be reared and finally distributed in the infested region. Of course these parasites may not be able to thrive, or even to live, in this country, but it is an experiment worth trying, and we certainly hope for much benefit from it.

Remedial Measures.

One of the most effective means of controlling the gypsy moth is by destroying the egg-masses on the trunks and branches of trees, on fences, stones, or wherever they occur. A sponge, brush or swab is dipped in creosote mixture, and the egg-masses are saturated with it. A long pole can be used to reach the egg-masses, but it is often necessary for men to climb about in the trees in order to reach them. Where brush land is badly infested, it is often best to cut and burn the brush between August and May to destroy the eggs. Spraying the foliage with arsenate of lead, using 5 pounds to 50 gallons of water, will of course save the trees from injury for the season. This poison adheres to the tree for a long time, and will not injure the leaves. Paris green can be used at the rate of one pound in 100 gallons of water, but two pounds of lime should be added to prevent injury to the foliage. This mixture will not adhere to the leaves as well as arsenate of lead.

The caterpillars can be gathered and destroyed while resting on the tree trunks or hiding under rubbish during the day. The chrysalids or pupae will be found in similar places, and can also be destroyed by heat or by crushing.

THE BROWN-TAIL MOTH.

Euproctis chrysorrhaea Linn.

This insect was first noticed in Somerville, Mass. in the early nineties, but was supposed to be some native species. It increased in abundance, and was brought to the attention of entomologists in 1897, who found it to be the brown-tail moth, a European pest introduced probably by accident into this country. A special appropriation was granted by the Legislature for fighting this insect, and the matter was placed in charge of the Gypsy Moth Commission, but all work of the Commission was discontinued in 1900. The brown-tail moth has spread rapidly to the north through Southeastern New Hampshire, Maine, and adults have been captured in St. John, New Brunswick, but may have been carried there by boats from Boston. The spread southward has been less rapid, Cape Cod being the most southerly point known to be infested. Toward the west the insect has reached Amherst, Mass.

Habits and Life History.

The eggs are laid in masses of about 300, on the under side of the leaves, the egg-masses being smaller and more elongated than those of the gypsy moth. They are also more of a reddish color, but are covered with hair in much the same manner. Egg-laying takes place between the middle and the end of July.

The eggs hatch early in August, and the young caterpillars feed gregariously upon the upper leaf surface, but soon begin to fasten a number of leaves together with silken threads which they spin, forming a nest or web on the ends of the small branches. On the approach of cold weather, about 250 caterpillars enter each web, and remain there, about one-fourth grown, through the winter, coming out early in April and feeding upon the buds, and later the opening blossoms

and leaves. The caterpillars feed during the day, and attack a large number of plants, preferring pear, cherry, apple and other fruit trees, but also attacking shade and forest trees,

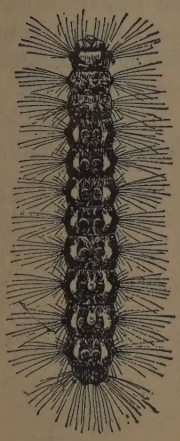

FIG. 5.—Caterpillar of brown-tail moth.
After Fernald.)

FIG. 6.—Web or winter nest of brown-tail moth.
(After Fernald.)

especially the oak. Large trees are often stripped of their leaves.

When full-grown, the caterpillars are about two inches

FIG. 7.—Female brown-tail moth.
(After Fernald.)

long, dark brown with an interrupted white stripe on each side, and two conspicuous red dots on the back. They are covered

with long hairs which are finely barbed and brittle. These break off, and, on coming in contact with the human skin, cause great irritation and sometimes serious illness. The full-grown caterpillar is represented by Figure 5, and Figure 6 shows the appearance of the web or winter nest.

The caterpillars become full-grown the last of June, make their cocoons at the tips of the twigs, often in a bunch of leaves, and the moths emerge two weeks later, or about the middle of July.

The moths are pure white except the end of the abdomen, which is brown, giving it the name of brown-tail moth. The

FIG. 8.—Tree pruner.

female has a wing spread of about one and one-half inches, while the male is somewhat smaller. (See Figure 7.) Both sexes fly at night, and may be taken around electric lights.

Means of Control.

The best of all remedies against this insect is the destruction of the caterpillars in the winter webs or nests. The winter nests can be readily seen on the twigs throughout the winter, and these should be clipped off with a long-handled tree pruner such as is shown in Figure 8, and gathered and burned. The caterpillars are hibernating in these nests from October to April. It is of no use to cut off the nests and leave them

on the ground, as the caterpillars may remain uninjured. All should be gathered and burned.

Spraying with poison, as has been described for the gypsy moth, can be practiced; the brown-tail caterpillars are more susceptible to the effect of poisons than the gypsy caterpillars.

Caterpillars which are crawling about in great numbers on trees, fences, etc., should of course be destroyed. Sprinkling with kerosene, either pure or in an emulsion, or even with strong soapsuds, is of considerable value in destroying them.